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# Biotechnology Notes

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**Biotechnology Notes**, a compilation of agency activities, news events, and upcoming meetings, is prepared for members of the U.S. Department of Agriculture's (USDA) Committee on Biotechnology in Agriculture (CBA) by USDA's Office of Agricultural Biotechnology (OAB).

## INSIDE USDA

### PLANT PUMPS: UNRAVELING THE MYSTERY OF PLANT NUTRITION

How plants carry nutrients from cell to cell has baffled scientists for years. Now a researcher at the University of Wisconsin, with partial support from the Cooperative State Research Service's Competitive Research Grants Office, has unlocked a few important clues.

Using a series of molecular biology techniques, Michael Sussman identified and isolated at least five genes that encode for the plant plasma membrane "pump" proteins. The so-called pump proteins are really molecules embedded in the cell membrane, and they are very difficult to study. Scientists do know, however, that they play a key role in moving minerals, sugars, and amino acids back and forth across cell membranes.

The identification of these genes is significant because the genes can serve as a probe to further study the structure and function of the membrane pump. These genes will also aid scientists in learning what controls the nutrient transport process at the cellular and molecular levels. This information can lead to developing plants with improved nutrient uptake and transport systems that will thrive in poor soils and with less frequent use of fertilizers.

### COTTON IN THE WILD

The Animal and Plant Health Inspection Service (APHIS) recently issued the first two permits for cotton experiments in Hawaii in a State where wild relatives and non-commercial cultivated species grow. The cotton has been genetically engineered for insect and herbicide resistance. The protocol includes specific measures to lessen any interspecies movement. If successful, the tests could result in an alternative to the use of chemical pesticides.

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## YEUTTER SPEAKS OUT ON BST

Appearing before the Swiss Commodities, Futures and Options Association in Burgenstock, Switzerland, September 8, U.S. Secretary of Agriculture Clayton Yeutter discussed several global issues, including the European Community's possible ban of bovine somatotropin (BST).

Characterizing BST as a "technological breakthrough," Yeutter cautioned against "making public policy decisions on the basis of emotion and political pressure, rather than through objective, scientific analysis." He said "there is no scientific evidence" that BST is a health threat and that "millions of people will be disserved if we do not take advantage of new technology that helps improve the quality of life."

## A LESSON IN RISK ASSESSMENT

How do legislators keep abreast of technical policy issues? They often depend on their staffers to keep informed. They also attend conferences to learn first-hand from the experts. Such a conference was held October 4-6 at the University of California, Davis. Sponsored by the State Legislative Leaders Foundation, the meeting was held to prepare legislative leaders to understand concepts in risk assessment, programs undertaken at the federal level, and scientific contexts for risk assessment. Many of the legislators felt that environmental risk is an arena in which they will have to make decisions in the next few years because of constituents' concerns over the environment and federal environmental mandates.

Sally McCammon, a biotechnologist with APHIS's Biotechnology, Biologics, and Environmental Protection unit explained the coordination among federal agencies for regulating biotechnology, the number and types of field tests that have been permitted, and APHIS's international role.

Other topics on the agenda included approaches to risk assessment and comparisons of risks, communicating risk to the public, examples of successful risk assessment, phantom risks, and impacts of risk on public policy.

## OAB REACHES OUT TO STUDENTS

Dateline: Washington, D.C. The Office of Agricultural Biotechnology (OAB) joined 95 other representatives from government and industry at American University's career day, held October 5, in Washington, D.C. The purpose of the annual event is to introduce college students to local employers and the variety of career opportunities that exist in the Metropolitan area. Students who lined up at the USDA/OAB booth asked about careers in science, economics, law, and international relations. Marti Asner, OAB public affairs specialist, coordinated the exhibit and was there to answer questions, distribute materials, and assist with preparation of resumes and application forms. Many of the brochures and information sheets were provided by USDA's Office of Personnel and by Pat Bickle, personnel assistant with APHIS's recruitment and development unit.

Dateline: Kansas City, Mo. The OAB joined about 500 other exhibitors at the national convention of the Future Farmers of America, Nov. 7-11, in Kansas City. About 23,000 high school FFA members attended the event, which has been held in Kansas



City since the 1920's. The OAB booth included an 8' x 10' photographic essay on agricultural biotechnology, a new set of fact sheets, buttons that read "Biotechnology: The Future of Agriculture", career information pamphlets, and "Don't Lug a Bug" luggage tags. Both student and teacher response to the exhibit was enthusiastic with several of the upper classmen saying they had given speeches on biotechnology in school. The ag teachers asked for more help in the area of lesson plans used for teaching biotechnology.

## BIOTECH EXPERTS JOIN APHIS

Frank Tang, an animal physiologist and a lawyer, has joined the Biotechnology Coordination and Technical Assistance staff of APHIS's Biotechnology, Biologics, and Environmental Protection staff. Before receiving his law degree from Syracuse University, Tang was assistant professor of oncology at the University of Rochester School of Medicine and Dentistry. He will be working on issues involving transgenic animals as well as veterinary biologics.

Val Giddings joins the same staff and will be working on issues related to genetically engineered organisms. Giddings comes from the World Bank where he was involved in a study of biotechnology in developing countries. He also directed two biotech projects while at the Office of Technology Assessment, an arm of the U.S. Congress.

## ACROSS THE MILES

USDA's Office of International Cooperation and Development issued a notice of intent to enter into a cooperative agreement with Cornell University and the University of Florida for international biotech research projects. The Cornell agreement would involve research with Italy's University of Bologna on the development of DNA-probes for identifying *Pseudomonas syringae* pathovar *glycinea*. Support to the University of Florida would involve collaboration with Singapore's National University on evaluating Brassicas as a clone source for resistance genes against *Xanthomonas*.

## ETHICS AND TRANSGENIC ANIMALS

Jean Larson, a supervisory technical information specialist with the National Agricultural Library, has begun a 4-month detail to the OAB to study the ethical and welfare issues concerning the production and potential uses of transgenic livestock animals. Larson is conducting literature searches as well as interviewing a broad spectrum of people within and outside of USDA. A final report documenting the issues will be circulated to USDA policymakers. If you have ideas on the subject you would like to share, please call Ms. Larson at 202-447-9165.

## OAB BRIEFS FORD NEW HOLLAND

Representatives of Ford New Holland and eight Scandinavian agricultural reporters met October 16 with OAB staffers to discuss USDA's role in biotechnology. Daniel Jones, OAB Deputy Director, described the research and regulatory activities at USDA; Martha Steinbock discussed international efforts; and Marti Asner covered the public information arena.

Questions from the journalists focused mainly on bovine somatotropin, research on transgenic fish, and how plant biotechnology might be used to help fight the war on illegal drugs.

Ford New Holland is a subsidiary of Ford Motor Company and manufactures farm and industrial equipment. Located in New Holland, Pa., the company conducts business in more than 120 countries with annual sales of \$3 billion.

#### MEDLEY ADDRESSES EUROPEAN AUDIENCES

Terry Medley, Director of APHIS's Biotechnology, Biologics, and Environmental Protection unit, discussed oversight of environmental releases at a technology conference in Bonn, West Germany, Sept. 25 and USDA's perspective on the introduction of transgenic plants at a conference held Sept. 27 in Ghent, Belgium. At both meetings Medley conveyed USDA's leadership role in helping to move biotechnology safely from the laboratory to the greenhouse and then to outdoor field plots. He described the importance of gaining public support for and confidence in field testing biotech products and the various avenues available in which the public can make its concerns known to public officials.

#### WHAT'S A GENE?

USDA's graduate school, evening division, will offer its first biotech course, "Foundations of Biotechnology: Concepts of Genetic, Molecular and Cell Biology." This is a basic level course open to all adults. It is being taught in Washington, D.C. by J. Christopher Cordaro and will run from January 23 to March 27. For details about registration or to receive a catalog, call 202-447-5885.

### NEWS AROUND THE COUNTRY (AND THE WORLD)

#### MERGER IDEA NIXED

At its September 28th board meeting, the Association of Biotechnology Companies (ABC) decided that a proposed merger with the Industrial Biotechnology Association would be "premature" at that time. Instead, board members recommended that the two trade associations increase interactions. In particular, ABC suggested more dialogue between the two associations, the formation of a "roundtable" to meet quarterly and review key issues, and creation of ad hoc working groups.

#### THE A-B-C's OF BIOTECH

A biotech resource manual for middle and high school science teachers is being prepared by the North Carolina Biotechnology Center working with the National Association of Biology Teachers and the Association of Biotechnology Companies. The manual is designed for those teachers who have already attended workshops on biotechnology but don't have the lessons, labs and other resources they need to teach what they have learned. The manual will contain lessons, labs, references and other resources



dealing with genetic engineering, biotech applications, careers in the industry, and bioethics.

## THE PATH OF LEAST RESISTANCE

More than 500 species of insects worldwide have become resistant to one or more pesticides, resulting in a pest management problem that affects not only crop production but also human and animal health. Transgenic plants, too, are just as likely to feel the impact of pest resistance. To overcome this growing problem, the Pesticide Research Center at Michigan State University has developed an interdisciplinary research, training and educational program.

About 25 faculty, research associates, and other staff are working to develop resistance management strategies that are profitable, safe and environmentally compatible. One program focuses on ways of extending the useful life of desirable insecticides, acaricides, fungicides, and herbicides. Other current research projects include resistance to Bacillus thuringiensis endotoxin and transgenic plants that contain insect resistance factors and resistance to benomyl and sterol biosynthesis inhibitors in apple scab.

In cooperation with the "Western Regional Coordinating Committee--60" pesticide resistance project, the Center publishes a free biannual newsletter that reviews current activities, news, and publications in resistance management both nationally and worldwide. To be placed on the mailing list for "Pesticide Resistance Management", call the Center at 517-353-9425 or 517-353-9430.

## SEEDS IN SPACE

In April 1984, the National Aeronautics and Space Administration (NASA) launched a free-flying satellite carrying 57 science and technology experiments, including one using 12.5 million tomato seeds held in five aluminum canisters. This month NASA plans a space shuttle mission to retrieve the experiments.

The tomato seeds will be analyzed and then packaged into laboratory kits for NASA to distribute to classrooms nationwide. Each kit will contain 50 ground-based control seeds and 50 flight seeds, along with at least one recommended experiment. Students from grades five through university level will be able to compare flight seeds with control seeds for germination rates and times, seed embryos, seedling vigor, phototropic responses, and fruit products. More advanced students can perform chromosome and population genetics studies. Students will keep records describing their results. These reports will be sent to NASA headquarters for compilation of a summary report. Each participating classroom will receive a copy of the summary report. The projects will also be placed on the NASA spacelink computer, an electronic information system for educators. NASA has invited USDA's "Ag in the Classroom" program to participate.

To learn more about Space Exposed Experiment Developed for Students (S.E.E.D.S.), write to SEEDS Project, Elementary and Secondary Programs Branch, Educational Affairs Division, NASA, Code XEO, Washington, D.C. 20546.

## IN CASE YOU WEREN'T THERE

- At the request of the embassy of West Germany, the OAB staff met with Brigitte Adler, a member of the West German parliament, on Oct. 10. Adler represents a district of small farmers in southern Germany and was interested in learning USDA's views on the development of agricultural biotechnology. The OAB staff provided an overview of the Department's domestic and international ag biotech activities.

- Speaking on "Challenges and Opportunities Facing Agricultural Research -- A Need for a Team Approach," Charles Hess, USDA Assistant Secretary for Science and Education, kicked off the annual meeting of the Agricultural Research Institute, October 11, in Washington, D.C. Some of the other topics covered included animal and plant genome research, setting priorities for ag research, formula versus competitive funding, food processing, and "USDA Involvement in Commodity Checkoff Programs," presented by Joann Smith, USDA Assistant Secretary for Marketing and Inspection Services.

- OAB Director Alvin Young was one of the featured speakers at the eighth annual research symposium of the Association of Research Directors of the Historically Black Land-Grant Colleges and Universities, October 11, in Crystal City, Va. Young discussed the challenges USDA faces in research funding, patenting, public awareness, and education. Young said the biggest challenge for the future is to bring more minorities and women into the area of science and technology.

Also speaking were Machi Dilworth, John Gorham, and Robert Faust. Dilworth, associate program manager for CSRS's Competitive Research Grants Office, talked about recent developments in plant biotechnology and the proposed plant genome mapping initiative. Gorham, a member of USDA's Agricultural Biotechnology Research Advisory Committee and a veterinarian with the Agricultural Research Service (ARS) at Washington State University, discussed advances and prospects in the application of biotechnology to animal science and veterinary medicine. Faust, ARS's national program leader, crop protection, talked about new uses for agricultural commodities and the role of microbial and other biotechnologies.

- The U.S. Academy of Science, the National Academy of Sciences (NAS), and the USSR Academy of Science sponsored a workshop on plant molecular biology at NAS headquarters in Washington, D.C., Oct. 11-13. Ten top plant molecular geneticists from both countries participated. The purpose of the workshop was to provide each side a general overview of the other's work in the field. A followup workshop is planned for the Spring of 1990 in the Soviet Union.

- On Oct. 17 and 18, USDA's Economic Research Service sponsored a conference entitled "Public Policy: Emerging Technologies in Agriculture and Agricultural Productivity and Growth." University and government economists discussed the use of various economic models that predict rate of change from new technologies, economic competitiveness, patenting, and other issues.



- Daniel Jones, OAB Deputy Director, briefed scientists, Nov. 14, in Corvallis, Oregon, on the **classification of organisms** under consideration for use in outdoor field tests. The classification system was developed by a working group of USDA's Agricultural Biotechnology Research Advisory Committee and is incorporated into USDA's draft research guidelines. The audience, which consisted mostly of microbiologists, expressed support for the classification system. Jones's presentation was part of a week-long meeting on biotechnology risk assessment and was sponsored by the Environmental Protection Agency.

### NEW PUBLICATIONS

- "Connections: Animals, People and Biotechnology" is the title of a new video available on short-term loan from the Industrial Biotechnology Association. Call Jeff Beddow at 202-857-0244 for details.
- Biotechnology Law Report. A newsletter for biotech professionals involved in legal, patenting, or regulatory issues. It also reproduces hard-to-find documents on various aspects of biotechnology law. For more information, call 212-289-2300.
- Investing in Research: A Proposal to Strengthen the Agricultural, Food, and Environmental System. Prepared by the National Research Council's Board on Agriculture. National Academy Press. 1989. Copies available from the National Academy Press, 2101 Constitution Ave., N.W., Washington, D.C. 20418.
- Profiles--Agricultural Sciences: Human Resources and Funding. A new 154-page report prepared by the National Science Foundation. Includes an array of data on certain fields of science and engineering. Report number NSF 89-319. Single copies may be obtained gratis from the National Science Foundation, Washington, D.C. 20550.
- Focus 1988: Proceedings of a National Symposium Honoring USDA Food and Agricultural Sciences National Needs Graduate Fellows. National Academy Press. Washington, D.C. 1989. Copies available from the Board on Agriculture, National Research Council, 2101 Constitution Ave., N.W., Washington, D.C. 20418.
- "Minutes of USDA's Agricultural Biotechnology Research Advisory Committee Meeting", held March 22-23, 1989. Document number 89-02. To receive a free copy, call the OAB office at 202-447-9165.
- "Guidance for U.S. Researchers Involved in International Exchange on Agricultural Biotechnology." A new brochure prepared by USDA's Office of Agricultural Biotechnology, the National Biological Impact Assessment Program, and the Office of International Cooperation and Development. To receive a copy, call 202-447-9165.

- Now available from the Industrial Biotechnology Association (IBA):

- Issue papers on science literacy in the United States, biotech initiatives in States, and biopesticides.

- Background paper and primer on European Economic Community organization and the operation as it relates to biotechnology.

- IBA member products' survey on product identification/use, product status, and company.

To receive a copy of any of these materials, call 202-857-0244.

- "Improving Risk Communication." Prepared by the National Research Council. National Academy Press. 1989. \$29.95. To order, call 202-334-2138.

- Biotechnology and the Research Enterprise: A Guide to the Literature. By William Woodman, Mack Shelley, and Brian Reichel. Iowa State University Press. 1989. \$49.95. To order, call 515-292-0140.

#### UPCOMING MEETINGS

Dec. 3-6: An international symposium entitled "Biotechnology: Science, Education and Commercialization." University of Florida, Gainesville, Fla. USDA's Office of Agricultural Biotechnology is a sponsor of the symposium. Call Ms. Lenie Breeze at 904-462-3904 for details.

Dec. 5: Second Public Meeting of the Washington Area Biotechnology Information Network. Rockville, Md. This meeting is free and open to the public. For details, call either Mr. R. Rader at 202-639-8989 or Ms. M. Warwick at 301-258-0552.

Dec. 6: Conference on "New Swine Growth Enhancers." Ames, Iowa. Call 515-294-5961.

Dec. 7-8: "Controversies, Challenges, and Trends: Food in the 1990's." Sponsored by the World Food and Drink Report. Call Susan Morgan at 202-662-9728.

Dec. 11-13: Second International Symposium on Gas, Oil, and Coal Biotechnology. New Orleans, La. Write to Institute of Gas Technology, 3424 South State St., Chicago, Ill. 60616.

Dec. 14: "The Coming Profit Opportunities in Biotechnology: A 1989/1990 Assessment." Washington, D.C. Call 617-863-1222.

Dec. 20: The Terminology of Biotechnology: A Multidisciplinary Problem. Honolulu, Hawaii. Write to Kurt Loening, Chemical Abstracts Service, P.O. Box 3012, Columbus, Ohio 43210.

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Jan. 3-7: Recombinant DNA Methodology Course. To be held at Catholic University of America, Washington, D.C. Call 202-635-5276.

Jan. 10-12: Meeting of USDA's Agricultural Biotechnology Research Advisory Committee (ABRAC). Washington, D.C. It will meet at USDA headquarters in Room 104-A of the Administration Bldg., 14th and Independence Ave., S.W., Washington, D.C. 20250. The meeting begins at 9 a.m. all three days; adjourns at 5 p.m. on Jan. 10 and 11; and at 1 p.m. on Jan. 12. Agenda items will include the USDA research guidelines, biotech research needs and priorities in agriculture, and updates on USDA biotech activities. For more details, call Alvin Young, ABRAC Executive Secretary, at 202-447-9165.

Jan. 16-18: Sixth International Symposium on Separation Science and Biotechnology. Fort Lauderdale, Fla. Call 301-898-3772.

Jan. 17-19: Fifth Annual MIT Symposium: Biotechnology Process Engineering. Cambridge, Mass. Call 617-253-0805.

\*\*\*HAPPY HOLIDAYS FROM THE OAB STAFF\*\*\*



ALVIN YOUNG,  
Director

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Biotechnology Notes is written and edited by Marti Asner, a public affairs specialist in USDA's Office of Agricultural Biotechnology. Suggestions for items to include in future issues are always appreciated and may be sent to USDA/OAB, Room 321-A, Administration Bldg., 14th and Independence Ave., S.W., Washington, D.C. 20250; or call 202-447-9165. The FAX number is 202-447-6488.







